

# Slope

Find the slope of a line when you have two points.

# The Definition of Slope

$$m = \text{slope} = \frac{\textit{rise}}{\textit{run}} = \frac{y_2 - y_1}{x_2 - x_1}$$

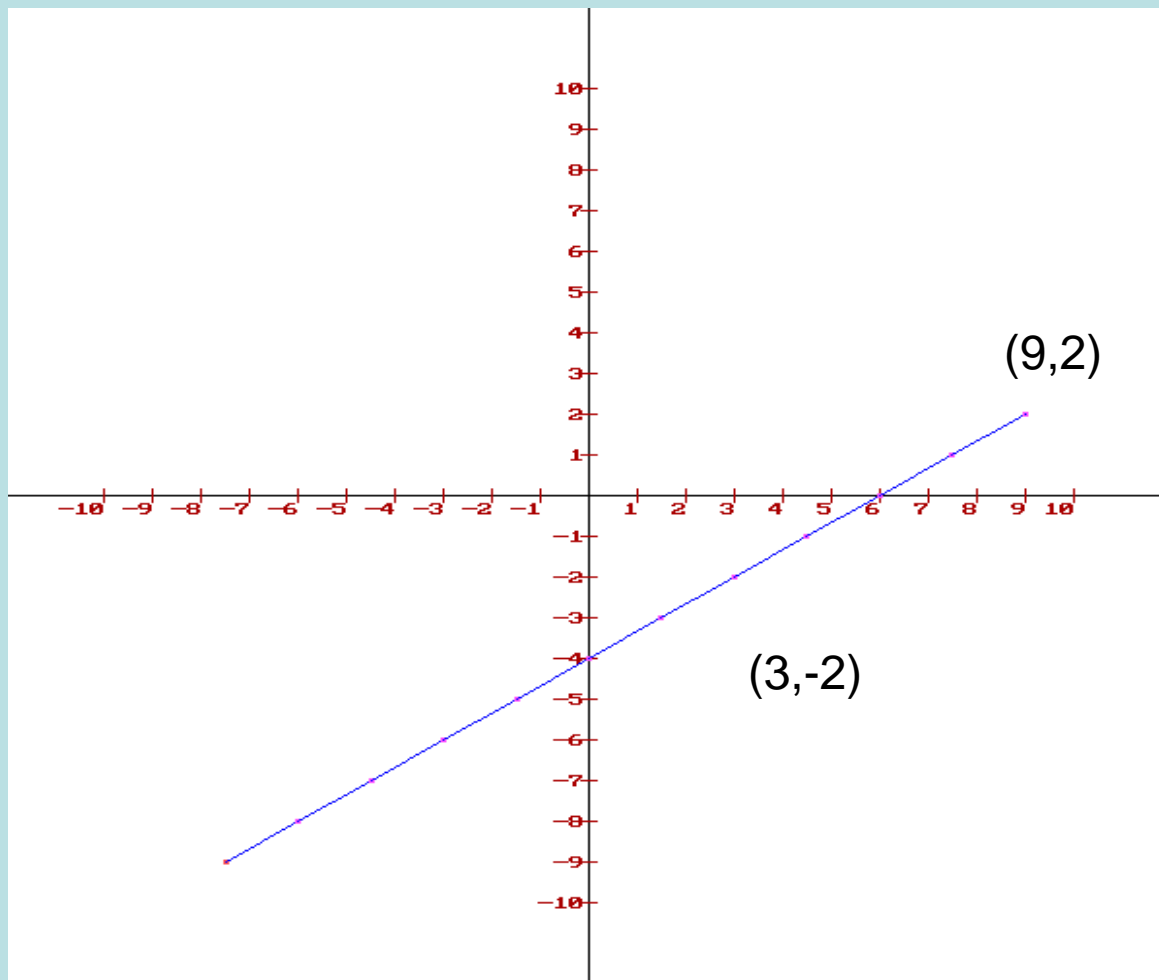
To find the slope of a line from two points you need to subtract the y values and divide by the difference in the x values.

# Example #1

1. Given the points (3,-2) and (9,2)
2. Use the equation  $m = (y_2 - y_1) / (x_2 - x_1)$
3. Subtract the y's  $2 - (-2) = 4$
4. Subtract the x's  $9 - 3 = 6$
5. Divide and simplify  $4/6 = 2/3$

$$m = 2/3$$

# GRAPH THE POINTS



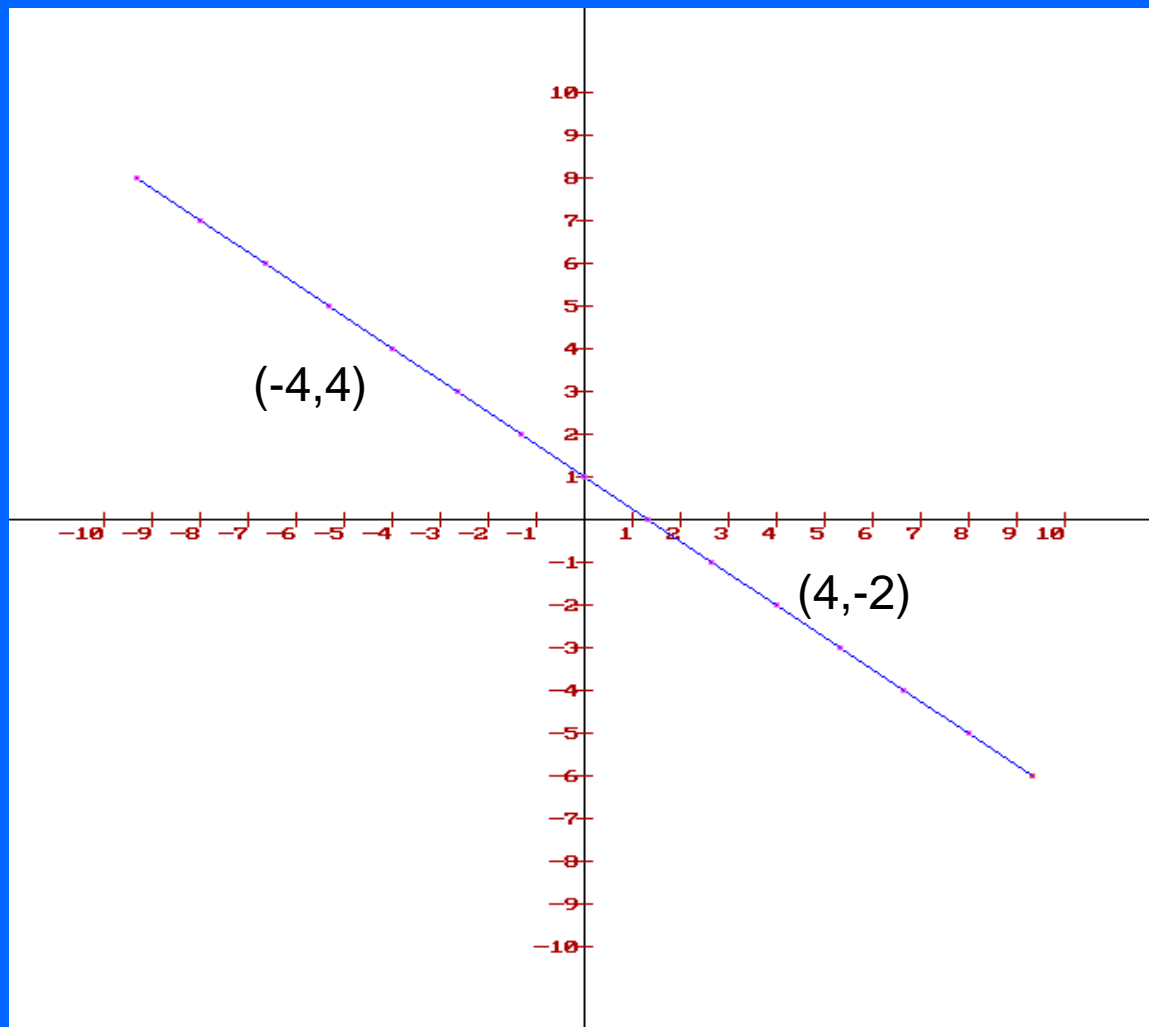
**Notice** that the line has a positive slope, that the line rises up as it goes left to right.

# Example #2

- Given the points (4,-2) and (-4,4)
- Use the equation  $m = (y_2 - y_1) / (x_2 - x_1)$
- Subtract the y's  $4 - (-2) = 6$
- Subtract the x's  $-4 - 4 = -8$
- Divide and simplify  $6 / -8 = -3/4$

$$m = -3/4$$

# GRAPH THE POINTS



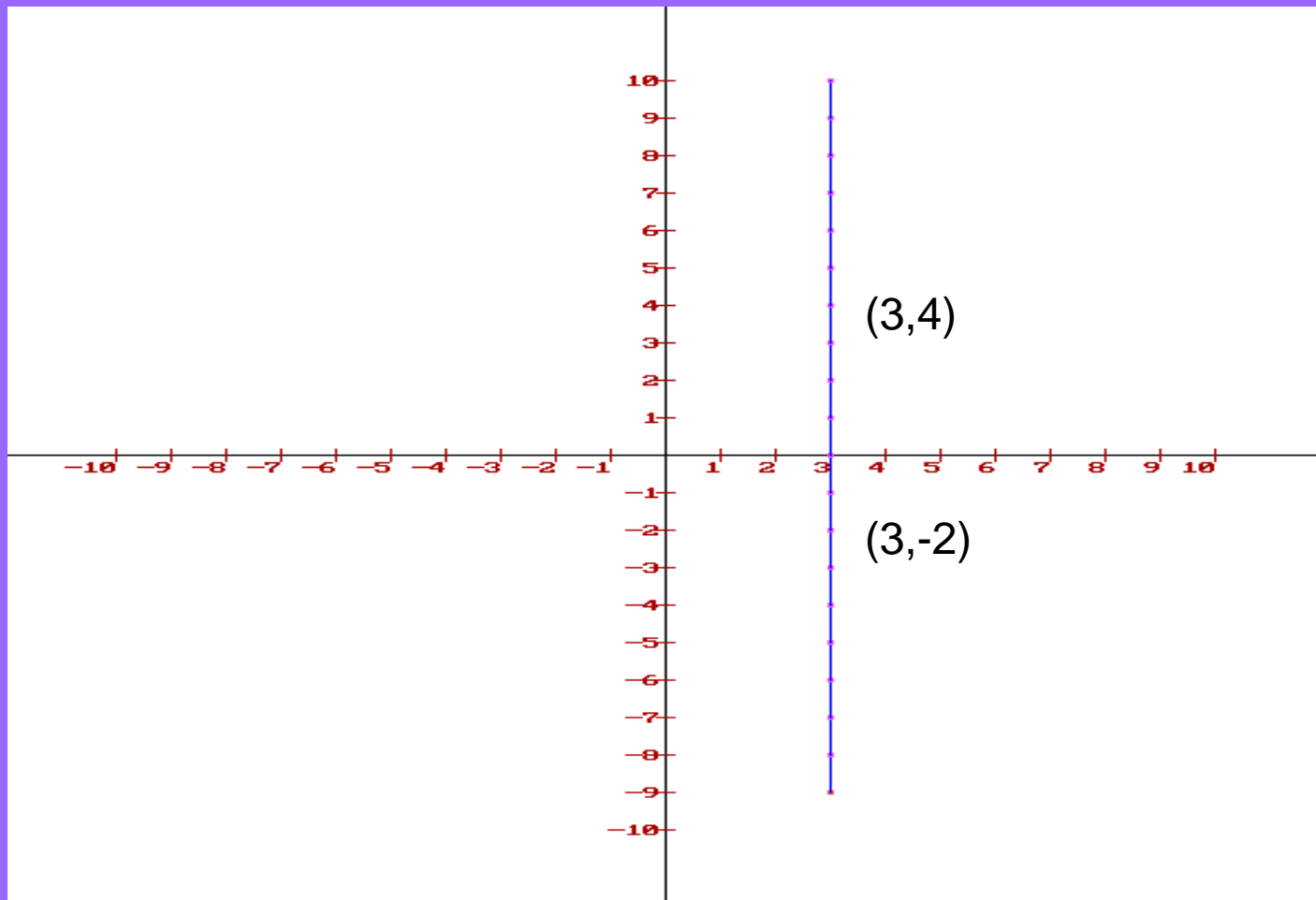
Notice that the slope of the line is negative, that the line goes down from left to right.

# Example #3

- Given the points (3,4) and (3,-2)
- Use the equation  $m = (y_2 - y_1) / (x_2 - x_1)$
- Subtract the y's  $-2 - 4 = -6$
- Subtract the x's  $3 - 3 = 0$
- Divide and simplify  $-6/0 = \text{undefined}$
- Remember that a fraction can not have zero in the denominator.

$$m = \text{undefined}$$

# GRAPH THE POINTS



Notice that the slope of the line is undefined, that it is **vertical**.

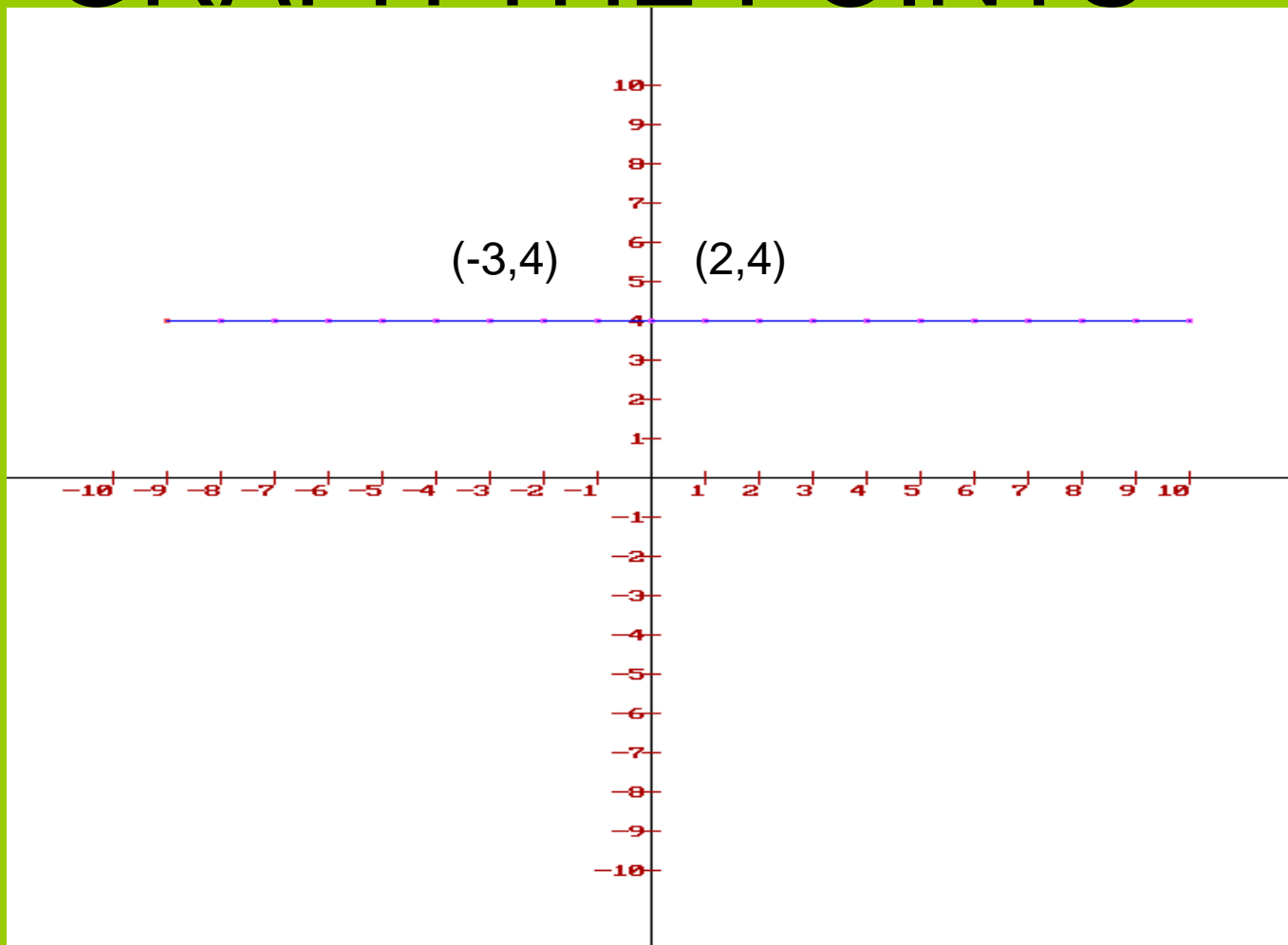


# Example #4

- Given the points  $(-3,4)$  and  $(2,4)$
- Use the equation  $m = (y_2 - y_1) / (x_2 - x_1)$
- Subtract the y's  $4 - 4 = 0$
- Subtract the x's  $2 - (-3) = 5$
- Divide and simplify  $0/5 = 0$
- Remember that if the numerator is zero the fraction simplifies to zero.

$$m = 0$$

# GRAPH THE POINTS



Remember that if the slope is zero the line is **horizontal**, that it is flat.